

15. (Amended) The end cap for a multi-pole high speed generator of Claim 9, wherein the central bore and the annular flange are dimensioned so as to be shrunk fit, respectively, around a shaft of a rotor of the rotor assembly and over axial ends of the support wedges.

16. (Amended) The end cap for a multi-pole high speed generator of Claim 14, wherein the manifold includes an annulus and at least one radial cooling medium gallery extending therefrom to at least one supply port formed in the support wedges.

REMARKS

This is a full and timely response to the non-final Office Action mailed November 19, 2002 (Paper No. 7). Reexamination and reconsideration in light of the above amendments and following remarks are courteously requested.

Claims 1, 2, 4-6, and 8-16 are now pending in the application with Claims 1, 8, and 9 being the independent claims. Claims 3 and 7 are canceled herein, Claims 17 and 18 were canceled in response to a previously imposed restriction requirement, and Claims 4-6, 8, 12, and 14-16 have been amended. No new matter is believed to have been added.

Before proceeding with the merits of the Office Action, Applicants wish to point out that the amendments to Claims 4-6, 8, 12, and 14-16 are merely cosmetic in fashion, and are being provided to even more clearly point out and distinctly claim the invention, and do not constitute narrowing amendments.

Drawings

The drawings were objected to under 37 C.F.R. § 1.83(a) as allegedly failing to show certain structural detail. Specifically, the Office Action alleges that the drawings fail to show at least one orifice at each of the first and second ends of the shaft, and at least one support wedge positioned between each of the poles with at least one supply port in each end. For at least the following reasons, Applicants traverse this objection.

The specification, at least on page 8, at lines 13-15, states that “[t]he shaft 14 shown in FIG. 2 has four orifices 22a-22d and 122a-122d (22c-22d and 122c-122d not visible) at each of the first and second ends respectively of the shaft 14.” A review of FIG. 2 indicates that two orifices (22a-22b and 122a-122b) are clearly shown on each end of the shaft 14. Hence, since two is most certainly “at least one,” this particular claim feature is clearly shown in at least FIG. 2.

With respect to the support wedges, these components are described in the specification, at least on page 8, line 17, through page 9, line 17, and depicted in at least FIGS. 2, 5, and 6. In particular, the specification states, and at least FIG. 2 illustrates, that the depicted rotor assembly 14 includes four outer support wedges 24a-d (24c-24d are not visible in FIG. 2) are positioned, one each, between each pole. Moreover, this portion of the specification also states, and at least FIGS. 5 and 6 illustrate, that each support wedge 24a-24d include at least one supply port 36 and 136 in a first end and a second end, respectively, and that each supply port is open to at least one axial channel 38 (page 9, lines 7-9). Hence, at least one support wedge, as described and claimed in the above-referenced application, is clearly shown in the drawings.

Based on the above, withdrawal of the objections to the drawings is respectfully solicited.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph:

Claims 3 and 7 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, the Office Action alleges that “the means for restraining” and “the means for extending” recited, respectively, in Claims 3 and 7, need to be clearly and fully disclosed.

In response, and while not conceding the propriety of the above-noted rejections, Applicants have canceled Claims 3 and 7, rendering the rejections moot. Reconsideration and withdrawal of the 35 U.S.C. § 112, second paragraph rejections is, therefore, respectfully solicited.

Rejections Under 35 U.S.C. § 103:

Claims 1-8 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Patent Nos. 5,587,616 (Johnsen ‘616) and 5,298,823 (Johnsen ‘823), and Claims 9-16 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Johnsen ‘616 and Johnsen ‘823 in view of U.S. Patent No. 5,325,009 (Capion). These rejections are respectfully traversed.

Independent Claims 1 and 8 relate to a high speed generator including a shaft having an axial bore with at least one orifice at first and second ends of the shaft, a rotor assembly mounted on the shaft that has a plurality of poles, and at least one support wedge positioned between each of the poles. Independent Claim 1 recites, *inter alia*, an end cap mounted on the rotor at opposite ends thereof, each of the end caps having means for restraining the at least one support wedge from radially outward movement and means extending from the at least one orifice at each of the first and second ends of the shaft for circulating a cooling medium between the shaft and the at

least one support wedge to cool the rotor assembly during operation of the multi-pole high speed generator.

Independent Claim 8 recites, *inter alia*, a first end cap disposed over a first axial end of the at least one support wedge and having radial fluid flow galleries extending from the at least one orifice at the second end of the shaft through which fluid exits the shaft to the at least one inlet supply port in each of the at least one support wedge and a second end cap disposed over a second axial end of the at least one support wedge and having radial fluid flow galleries extending from the at least one outlet supply port in the at least one support wedge to the at least one orifice at the first end of the shaft through which fluid enters the shaft before exiting the rotor.

Johnsen '616 relates to a rotor for a dynamoelectric machine. The rotor (30) is a two-pole rotor, and includes a shaft (32). As readily admitted in the Office Action, Johnsen '616 fails to disclose at least one support wedge positioned between each pole, and cites Johnsen '823 as making up for this alleged sole deficiency. While not conceding that either Johnsen '616 or Johnsen '823 include at least one support wedge as recited in independent Claims 1 and 8, Applicants submit that neither Johnsen '616 nor Johnsen '823 disclose, or even remotely suggest, at least the above-noted features recited in independent Claims 1 and 8. Namely, neither of these citations disclose or suggest end caps that include at least the above-recited elements of independent Claims 1 and 8.

The Office Action alleges that Johnsen '616 discloses an end cap (80). However, while not conceding that this component, referred to in Johnsen '616 as a radially-extending wall, is at all an end cap, it is submitted that the radially-extending wall (80) does not include at least "means for restraining the at least one support wedge" or "means extending from the at least one

orifice at each of the first and second ends of the shaft for circulating a cooling medium between the shaft and the at least one support member,” as recited in independent Claim 1. It is further submitted that the radially-extending wall (80) is not “disposed over a first axial end of the at least one support wedge” and does not include at least “radial fluid flow galleries extending from the at least one orifice at the second end of the shaft through which fluid exits the shaft to the at least one supply port in each of the at least one support wedge,” as recited in independent Claim 8.

Moreover, Applicants submit that Johnsen ‘823 fails to make up for at least the deficiencies noted above with respect to Johnsen ‘616. Indeed, as the Office Action readily indicates, an end cap is not even shown in Johnsen ‘823. Since an end cap is not shown in Johnsen ‘823 it cannot be relied upon to disclose or suggest at least the features that are noted as being deficient in Johnsen ‘616.

As regards independent Claim 9, this claim relates to an end cap for a multi-pole high speed generator and recites, *inter alia*, paired end cap openings in the end wall with each pair at 90° angles to one another. The Office Action readily admits that Johnsen ‘823 does not disclose end cap openings, and relies on Capion to make up for this alleged sole deficiency.

Initially, Applicants wish to point out that Johnsen ‘823, as was noted above, fails to disclose an end cap at all, much less an end cap that includes the recited paired end cap openings. Nonetheless, it is further submitted that Capion fails to disclose, or even remotely suggest, at least paired openings in the end wall with each pair at 90° angles to one another, as recited in independent Claim 9.

Reconsideration and withdrawal of the § 103 rejections is, therefore, respectfully requested.

Conclusion

In view of the foregoing, independent Claims 1, 8, and 9 are patentable over the citations of record. The dependent claims are also submitted to be patentable for the reasons given above with respect to the independent claims and because they recite features which are patentable in their own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

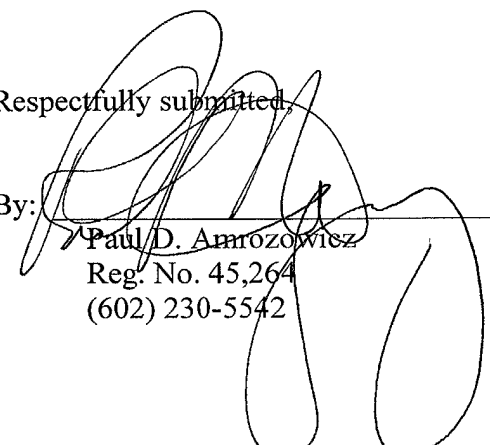
Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

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Respectfully submitted,

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PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: G. E. TORNQUIST et al.

Serial No.: 09/991,501

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For: IMPROVED ROTOR END
CAPS AND A METHOD OF
COOLING A HIGH SPEED
GENERATOR

Group Art Unit: 2834

Examiner: H. Elkassabgi

Commissioner of Patents and Trademarks
Box Non-Fee Amendment
Washington, D.C. 20231

VERSION WITH MARKINGS TO SHOW CHANGES

The following clearly show the changes being made in the amendment filed contemporaneously herewith.

IN THE SPECIFICATION:

The specification is amended as follows:

Pages 9 and 10, lines 18-23, and 1-8, respectively, are amended as follows:

--Further referring to FIGS. 1 and 2, the rotor assembly 12 includes the end cap 16a over a first end of the rotor body and an end cap 16b over a second end of the rotor body. The first end of the rotor body is the anti-drive end, and the second end of the rotor body is the drive end. The end caps 16a and 16b, as shown more particularly in FIGS. 2, 3 and 4 comprise a substantially circular end wall 40 circumferentially surrounded by an annular flange 42 (see FIG.

1). The annular flange 42 projects inwardly from the end wall 40 toward the opposite end cap. The end caps 16a and 16b shown in FIGS. 1-4 include four paired end cap openings 46 with each pair arranged at 90 degree angles to each other. In the first embodiment, the paired end cap openings are arranged circumferentially around the perimeter of the end wall 40 with a separate cooling medium feed port 47 between the openings in each pair. In an alternative embodiment, the paired end cap openings 46 may be arranged along the same radial line (not shown) with at least one of the openings in each pair serving as the cooling medium feed port as hereinafter described. The feed port is open to the inside of the end cap. Each of the end caps 16a and 16b include a bore 20 substantially in the center of the end wall 40.

Page 12, lines 7-12, is amended as follows:

--As further shown in FIG. [1] 2, the end caps 16a and 16b also include a raised peripheral edge 56 having a plurality of circumferentially spaced openings 58 provided therein. After the completely assembled rotor assembly is tested on a balance machine, weights (not shown) may be selectively inserted and secured into at least one of the plurality of circumferentially spaced openings 58 in order to balance the rotor assembly which helps control vibration of the rotor assembly 12 during generator operation.--

IN THE CLAIMS:

Claims 3-8, 12, and 14-16 are amended as follows:

Claim 3 is canceled.

4. (Amended) The multi-pole high speed generator of Claim 1, wherein each of the end caps includes a plurality of radially circumferentially spaced openings around a peripheral raised edge of the end caps to selectively receive weights therein [for balancing] to balance the rotor.

5. (Amended) The multi-pole high speed generator of Claim 2, wherein each of the end caps include an end cap bore that is substantially [in the] centered [of] in the end wall portion.

6. (Amended) The multi-pole high speed generator of Claim 5, wherein the end cap bore and the annular flange are shrunk fit, respectively, around the shaft and over [the] axial ends of the at least one support wedge, [the] each end cap[s] sealing at least an end of the rotor [ends] and restraining the at least one support wedge on the rotor.

Claim 7 is canceled.

8. (Amended) A multi-pole high speed generator, comprising:
a shaft having an axial bore with at least one orifice extending radially from [said] the bore at each of a first and second end thereof;
a rotor mounted on the shaft, the rotor having a plurality of poles and at least one support wedge positioned between each of the poles, the at least one support wedge having at least one inlet supply port and at least one outlet supply port open to at least one axial channel in the at least one support wedge;

a first end cap disposed over a first axial end of the at least one support wedge and having radial [cooling medium] fluid flow galleries extending from the at least one orifice at the second end of the shaft through which [the cooling medium] fluid exits the shaft to the at least one inlet supply port in each of the at least one support wedge and a second end cap disposed over a second axial end of the at least one support wedge and having radial [cooling medium] fluid flow galleries extending from the at least one outlet supply port in the at least one support wedge [receiving the cooling medium] to the at least one orifice at the first end of the shaft through which [the cooling medium] fluid enters the shaft before exiting the rotor.

12. (Amended) The end cap for a multi-pole high speed generator of Claim 9, wherein the paired end cap openings are arranged along [the same] a radial line in the end wall and at least one of the openings in each pair serves as a cooling medium feed port

14. (Amended) The end cap for a multi-pole high speed generator of Claim 9, wherein the end cap further includes a manifold at a hub location formed on [the] an interior portion of the end cap.

15. (Amended) The end cap for a multi-pole high speed generator of Claim 9, wherein the central bore and the annular flange are dimensioned so as to be shrunk fit, respectively, around a shaft of a rotor of the rotor assembly and over [the] axial ends of the support wedges.

16. (Amended) The end cap for a multi-pole high speed generator of Claim [15]
14, wherein the manifold includes an annulus and at least one radial cooling medium gallery
extending therefrom to at least one [support]supply port formed in the support wedges.